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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,484	04/15/2004	Stephanie Lannc	Q80977	6510

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EXAMINER	
GARCIA, LUIS	
ART UNIT	**PAPER NUMBER**
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/824,484	LANNE ET AL.	
	Examiner	Art Unit	
	Luis F. Garcia	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 1, 2-3, 4 and 8-11 are rejected** under 35 U.S.C. 102(e) as being anticipated by Handelman (US 6,574,018).

Regarding claim 1, Handelman discloses a network element for use in an optical communication network, in particular a DWDM communication network,

the network element comprising:

a plurality of receivers for receiving optical communication signals **(FIG. 7 in which receivers are inherently included at the end node for receiving the WDM signal via fiber 540)**,

a plurality of transmitters for transmitting optical communication signals **(FIG. 7 (510-transmitter UNIT) for transmitting a plurality of wavelengths/optical communications signals)**, and

a plurality of network connections, each network connection having an individual signal impairment characteristic **(FIG. 11 and col23 ln13-26/col12 ln36-43 in which each network connection (e.g wavelength) has individual signal**

impairments (e.g interference) which are detected via respective BER measurements),

wherein the pluralities of receivers and transmitters employ a plurality of different modulation schemes **(FIGs. 5,11 and col13 ln38-55 in which a plurality data rates (modulation schemes) are used based on detect signal impairments. NOTE: the transmitters and receivers inherently work in conjunction, e.g. the receivers must be able to decode the dynamically changing data rates (modulation schemes)),** and

wherein the pluralities of receivers and transmitters are assigned to the network connections as a function of the individual signal impairment characteristics **(FIG. 5 and col23 ln27-55 in which the transmitters are assigned channels based on detected interference (signal impairment characteristics)).**

Regarding claims 2-3, Handelman further discloses a multiplexer and a demultiplexer (FIGs. 1, 3-6)

Regarding claim 4, Handelman discloses the network element of claim 1 as applied above.

Handelman further discloses comprising a lightpath provisioning unit configured to select one from the plurality of transmitters for a signal to be transmitted as a function of an impairment parameter corresponding to a desired network connection **(FIG. 5 (400-network control system) and col23 ln13-55 in which the network control system (lightpath provision unit) selects the appropriate transmitters for**

transmitted data a specific data rate which is determined by the signal impairment (e.g detected interference)).

Regarding claim 8, rejected as stated in claim 1 rejection in which the modulation schemes comprise a plurality of different data rates (bit rates).

Regarding claim 11, rejected as stated in claim 11 rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 9-10 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Handelman.

Regarding claims 9 and 10, Handelman disclose the limitation of claim 1 as applied above.

Handelman does not expressly disclose incorporating the system into a plurality of nodes which will upgrade/improve the network in regards to the allowed distance between nodes. However, it would have been obvious to one of ordinary skill in the art at the time of invention that Handelman is applicable to many types of well know WDM network topologies which include many nodes, e.g. Mesh, Ring, Star, Tree, Line, etc. The motivation being that this allows the distance between nodes in the different

topologies to be increased by improving the quality of the optical signal (e.g. reducing interference between wavelengths); thereby, reducing the need for expensive repeaters and/or optical amplifiers between nodes.

3. **Claims 1-5, 7 and 9-11 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Bergano et al (US 5,946,119) in view of Bakhshi et al (Optical Society of America 2001) Bergano et al hereinafter referred to as Bergano and Bakhshi et al.

Regarding claim 1, Bergano discloses a network element for use in an optical communication network, in particular a DWDM communication network,

the network element comprising:

a plurality of receivers for receiving optical communication signals **(FIG.1 (R))**,

a plurality of transmitters for transmitting optical communication signals **(FIG. 1 (T))**, and

a plurality of network connections, each network connection having an individual signal impairment characteristic **(col2 ln26-43 in which each connection has an individual signal impairment characteristic)**,

wherein the pluralities of receivers and transmitters employ a plurality of different modulation schemes **(col2 ln26-43 in which the transmitters employ different modulation schemes (e.g. NRZ, RZ, amplitude mod., phase mod. Polarization mod.) in order to optimize the characteristics of a given channel)**, and

wherein the pluralities of receivers and transmitters optimize the network connections as a function of the individual signal impairment characteristics **(col2 ln26-43 in which the transmitter optimizes the characteristics of a given channel in order to compensate for individual signal impairment characteristics. NOTE: the transmitter and receiver inherently work in conjunction to optimize the channel, e.g. the receiver must know how the transmitter is going to optimize (e.g. change format) a given channel in order to be able decode it)**.

Bergano does not expressly disclose wherein the pluralities of receivers and transmitters are assigned to the network connections as a function of the individual signal impairment characteristics.

Bakhshi teaches wherein the pluralities of receivers and transmitters are assigned to the network connections as a function of the individual signal impairment characteristics **(pg3 Conclusions in which the transmitters with a CRZ modulation format are best utilized/assigned as edge channels due to the wavelength dependent dispersion of an optical fiber (individual signal impairment characteristics), while RZ, NRZ or CRZ are all equally applicable for the center channels)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Bergano and incorporate Bakhshi's teachings of assigning different modulation schemes to transmitters based on signal impairment characteristics. The motivation being that this allows an optical network to optimize the individual channels by assigning transmitters specific modulation formats, e.g. Bakhshi FIG. 4, center

channels can be implemented in less expensive and easier to implement RZ or NRZ modulation formats without incurring significant degradation when compared to CRZ; however, for edge channels, a more complex and harder to implement CRZ modulation format is best because it offers significantly better transmission characteristics than RZ and NRZ at that given wavelength (edge wavelength). Therefore, allowing the system to dynamically improve distance based transmission characteristics by implementing an appropriate modulation format at the transmitters. *NOTE: Bergano is a common inventor in both Bergano et al and Bakhshi et al.*

Regarding claim 2, Bergano in view of Bakhshi disclose the network element of claim 1 as applied above.

Bergano further disclose comprising a multiplexer adapted to multiplex optical communication signals from the plurality of transmitters employing different modulation schemes onto a single optical output fiber **(FIG. 1 (103-signal combiner) in which the signal combiner is functionally equivalent to a "multiplexer", e.g. the signal combiner combines λ_1- λ_N onto a single output fiber)**.

Regarding claim 3, Bergano in view of Bakhshi disclose the network element of claim 1 as applied above.

Bergano further discloses comprising a demultiplexer adapted to demultiplex optical communication signals from a single optical input fiber to the plurality of receivers employing different modulation schemes **(FIG. 1 (108-splitter, 109-BPF) in which the splitter and the BPFs work in conjunction to demultiplex the input WDM**

signal and allocate the wavelengths to there respective receiver; thereby, making 108 and 109 functionally equivalent to a "demultiplexer").

Regarding claim 4, Bergano in view of Bakhshi disclose the network element of claim 1 and choosing the appropriate modulation format (transmitter) based on the signal impairments as applied above.

Bergano in view of Bakhshi does not expressly disclose a lightpath provisioning unit. However, it would have been obvious to one of ordinary skill in the art at the time of invention that a Network Manager (lightpath provisioning unit) is well known and commonly used to manage the numerous devices and allocate/drop/maintain/supervise wavelength channels within a network. The motivation being that it provides an efficient way to manage the network. Therefore, having a network manager (provisioning unit) is considered obvious in view of Bergano in view of Bakhshi.

Regarding claim 5, rejected as stated in claim 1 rejection in which the impairment parameter is based on distance, e.g. Bakhshi FIG. 4- impairment parameter dispersion is caused by distanced traveled on the link (distance to target node).

Regarding claim 7, rejected as stated in claim 1 rejection in which the WDM transmitter has a plurality of different carrier wavelengths for modulation, e.g. Bergano FIG. 1 (λ_1-λ_N), Bakhshi FIG. 1 (LD1-64).

Regarding claims 9 and 10, Bergano in view of Bakhshi disclose the limitation of claim 1 as applied above.

Bergano in view of Bakhshi does not expressly disclose incorporating the system into a plurality of nodes which will upgrade/improve the network in regards to the

allowed distance between nodes. However, it would have been obvious to one of ordinary skill in the art at the time of invention that Bergano in view of Bakhshi is applicable to many types of well know WDM network topologies which include many nodes, e.g. Mesh, Ring, Star, Tree, Line, etc. The motivation being that this allows the distance between nodes in the different topologies to be increased; thereby, reducing the need for expensive repeaters and/or optical amplifiers between nodes.

Regarding claim 11, rejected as stated in claim 1 apparatus rejection.

4. **Claim 6 is rejected** under 35 U.S.C. 103(a) as being unpatentable over Bergano in view of Bakhshi in further view of Suzuki (US 5,524,144).

Regarding claim 6, Bergano in view of Bakhshi disclose the network element of claim 1 as applied above.

Bergano in view of Bakhshi does not expressly disclose wherein the plurality of modulation schemes comprises direct modulation and external modulation of the optical communication signals to be transmitted.

Suzuki teaches wherein the plurality of modulation schemes comprises direct modulation and external modulation of the optical communication signals to be transmitted **(FIGs. 5, 6, 8 in which the modulation schemes comprise direct and external modulation)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Bergano in view of Bakhshi and incorporate Suzuki's teaches of using direct and external modulation. The motivation being that channel performance is

enhance by taking into consideration the effects signal impairments (e.g dispersion) on directly/externally modulated data. As shown by Suzuki FIG. 8 and col11 ln34-60, in which direct modulation is less effected by dispersion below the zero dispersion wavelength and external modulation is less effected by dispersion above the zero dispersion wavelength. Therefore, allowing the system to further optimize the transmission channels by transmitting data via direct or external modulation.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis F. Garcia whose telephone number is (571)272-7975. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken N. Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER